

Claims

What is claimed is:

1. A system for monitoring a fabrication process, comprising:
 - a system for directing light toward one or more gratings located on at least one portion of a wafer;
 - a fabrication monitoring system operable to measure light reflected from the one or more gratings and to produce a distortion measurement;
 - a distortion measurement data store operable to store one or more distortion measurements; and
 - a processor operatively coupled to the fabrication monitoring system where the processor receives the distortion measurement from the fabrication monitoring system and records the distortion measurement in the distortion measurement data store.
2. The system of claim 1, the fabrication monitoring system further comprising a scatterometry system for processing the light reflected from the one or more gratings.
3. The system of claim 1 further comprising:
 - at least one fabrication component operable to perform one or more semiconductor fabrication steps on at least one portion of a wafer; and
 - a fabrication component driving system for driving the at least one fabrication component.
4. The system of claim 3, the processor being operatively coupled to the scatterometry system, the processor analyzing a scatterometry data received from the scatterometry system and producing a feed-forward control data, the processor controlling, at least in part, the at least one fabrication component *via* the fabrication component driving system based, at least in part, on the feed-forward control data.
5. The system of claim 4 further comprising a scatterometry signature data store operable to store one or more scatterometry signatures, where the scatterometry signatures code information associated with one or more grating parameters.

6. The system of claim 5, where the one or more grating parameters comprise at least one of grating line width, grating line depth, grating line location, space between one or more grating lines, space between one or more gratings and grating location.

7. The system of claim 6, the processor logically mapping the wafer into one or more grid blocks and making a determination of the acceptability of a distortion measurement in the one or more grid blocks.

8. The system of claim 7, wherein the processor determines the existence of an unacceptable distortion measurement for at least a portion of the wafer based on comparing one or more distortion measurements to one or more stored distortion measurements.

9. The system of claim 8, where a distortion measurement records information associated with at least one of horizontal stretch, horizontal compression, horizontal shift, vertical stretch, vertical compression and vertical shift.

10. The system of claim 9, wherein the processor employs a non-linear training system in computing the feed-forward control data.

11. A method for monitoring a semiconductor fabrication process, the method comprising:

- logically partitioning a wafer into one or more portions;
- fabricating one or more gratings on the wafer;
- directing an incident light onto at least one of the one or more gratings;
- collecting a reflected light reflected from the at least one grating;
- measuring the reflected light to determine one or more distortion measurements associated with the at least one grating; and
- storing the one or more distortion measurements.

12. The method of claim 11 where the one or more distortion measurements record information associated with at least one of horizontal stretch, horizontal compression, horizontal shift, vertical stretch, vertical compression and vertical shift.

13. The method of claim 12, further comprising processing the reflected light in a scatterometry system.

14. The method of claim 13 further comprising:

computing one or more fabrication process adjustments by comparing the one or more distortion measurements to one or more scatterometry signatures associated with one or more stored distortion measurements; and

adjusting one or more fabrication processes based, at least in part, on the one or more fabrication process adjustments.

15. The method of claim 14 where computing the one or more fabrication process adjustments is based, at least in part, on data received from the scatterometry system.

16. The method of claim 15 further comprising:

employing one or more non-linear training processes to compute the one or more fabrication process adjustments.

17. A system for monitoring a semiconductor fabrication process, comprising:

means for partitioning a wafer into one or more grid blocks;

means for sensing distortion in at least one of the one or more grid blocks; and

means for recording the distortion sensed in the at least one grid block.

18. The system of claim 17 further comprising:

means for controlling a fabrication process on a wafer portion; and

means for selectively controlling the means for controlling fabrication.